JSP
TELECONSULTANCY

ATS-QSIG Conformance and Interoperability Test System

This ATS-QSIG protocol test system is known as the benchmark for ATS-QSIG protocol testing. It was employed by EUROCONTROL during the European and Oceanic ATS-QSIG field trials to perform both conformance testing and interoperability testing on ATS-QSIG implementations from 5 major European VCS suppliers.

ATS-QSIG

Today ATS-QSIG networks are being rolled out in many European countries and this internationally recognised test system continues to be the main benchmark for Factory Acceptance Testing of ATS-QSIG interfaces prior to their installation in operational environments.

These systems are currently used by the major European Voice Communication System players who consider it an important instrument in their ATS-QSIG regression testing when performing VCS functionality enhancement and upgrades at the application layer for their Air Navigation Service Provider clients.

These systems are also deployed by many ANSPs in their Area Control Centres, Approaches and Towers as test instruments, allowing their staff to perform routine day-to-day checks and to also assist them when commissioning new ATS-QSIG interfaces connected via national and international links to their neighbouring centres.

ATS-QSIG protocol test system

The test system is comprised of a powerful high speed HP PT502 dual WAN port stimulus-and-response protocol tester and a rack mountable ECMA-253 converter shelf fitted with a power supply module and two G.703/EIA530 converter modules. Each module can automatically synchronize and maintain synchronization to a G.703 64kbit/s co-directional line either through a received 8kHz octet timing signal or through a built-in HDLC flag search algorithm.

Conformance testing

When a WAN port application processor is loaded with Emulation software, the Test System has the capability of performing protocol emulation tests and running 5 ETSI approved ATS-QSIG test suites consisting of hundreds of test cases in order to verify that implementations conform with ETSI and ECMA-international nominated standards.

The instrument is pre-loaded with necessary system software, application processor software and the following ECMA 312 compliant ATS-QSIG test suites, comprising of test cases for valid behaviour, invalid behaviour and inopportune behaviour.

- Layer 2 (EN 300 402, ITU-T Q.921)
- Layer 3 Basic Call and Transit Call (EN 300 172, ECMA 143)
- Layer 3 Generic Functional Protocol Mono & Transit EN 300 239, ECMA 165

Test suite execution is automatic and it is possible to easily download all test case traces in real time to a PC via its serial port.

Interoperability testing

When a WAN port application processor is loaded with the Monitor software, the Test System works in high impedance mode and has the capability of capturing protocol exchanges on the 64kbps digital unrestricted co-directional line (D64U) between VCSs, in order that any interoperability problems can be easily identified and resolved.

G.703/EIA530 converter modules

The G.703-EIA530 module is a 6 layer printed circuit board with surface mount technology and a FPGA (Field programmable gate array) semiconductor device containing programmable logic. Through an on-board port it is possible for the supplier to re-program the FPGA with future enhanced functionality and updates.

Five front panel LEDs indicate the Power ON state, Rx line activity, Tx line activity, Octet Timing Sync and/or HDLC sync.
A removable 5 screw terminal block on the rear panel permits easy connection of G.703 64kbit/s co-directional Tx/Rx pairs while a EIA-530/DB25F socket supplies/ receives the 16kbit/s D_Q signalling channel to/from the PT502 protocol tester.

ATS-QSIG Conformance and Interoperability Test System

PT502 characteristics
(**Interface:** Dual WAN ports
(**Processors:** 3 x 68000 plus up to 2 x 68030
(**Hard Drive:** Large capacity hard drive
(**Floppy Drives:** 2 x 2HD disk drives
(**RAM memory:** 6MB
(**Printer ports:** Parallel and Serial

Electrical Characteristics of the G.703 codirectional interface
(**Interface:** ITU-T G.703 co-directional interface.
(**G.703 Signal In and Out:** 2 wire symmetrical, electrically isolated, short-circuit protected, overvoltage protected
(**Maximum Range:** Up to 800m over 24 gauge (0.5mm)
(**Data Rate:** 64,000 bps (on G.703 co-directional line)
(**Line Signal Coding:** 64kbps Codirectional line code
(**Control Signals:** None
(**Impedance:** 120Ω balanced (G.703 Emulation Mode), 1.2KΩ balanced (G.703 Monitor Mode),
(**Clock Frequency:** 64KHz +/-100ppm
(**"Pulse" Amplitude:** 1.0V nominal +/- 10%
(**"Zero" Amplitude:** 0V +/-0.1 V maximum
(**Protocol:** Synchronous 16KHz (64KHz gated clock), full duplex and bi-directional monitor

Electrical Characteristics of the EIA-530 interface
(**Interface type:** EIA-530 interface for connection to the Protocol Tester   (using either DB25 to MB34 or DB25 to DB37 adapter cable supplied)
(**Connector:** DB25/Female
(**Data Rate:** 16,000 bps (containing only extracted D_Q signalling data)
(**Data Type:** Balanced for V.35 and V.36 (RS.449)
(**Impedance:** 120 Ω balanced (EIA-530)

Connectors
(**G.703-EIA530 converter module:** One removable 5-screw terminal block with terminals for Transmit and Receive Pairs of codirectional interface and ground terminal;
(**One DB25/Female connector:** to connect to PT502 protocol tester
(**Power Supply module connectors:** One AC mains power inlet socket for connection of mains power lead (supplied)

Front panel Indicators
(**G.703-EIA 530 module indicators:** 5 front panel LEDs: Power, Rx Signal, Tx Signal, OCT (synchronization with octet violations), HDLC (synchronization with HDLC flag search method).
(**Rack Power Supply Module:** Power on/off LED (located within front panel button)

Front panel Switches
(**G.703-EIA 530 module rotary switch:** 1 front panel rotary switch (used to select Emulation and Monitor modes)
(**Rack Power Supply module:** 1 front panel Power on/off button containing orange LED.

Rear panel Switches
(**Rack Mains power switch:** 1 rear panel PWR on/off switch located above mains power inlet.
(**Mains power selector:** 1 rear panel 120VAC-230VAC mains selector located below mains power inlet

Cables supplied
(**E**ither DB25 to MB34 or DB25 to DB37 adapter cable supplied)
(Mains power cable

Synchronization delay parameters
(**Delay for line synchronisation using Octet violation method:** 250 µs
(**Delay for line synchronisation using HDLC flag search method:** 1 ms (detection of 2 consecutive flags)
(**Loss of line synchronization using HDLC flag search method:** when no flag occurs in 200ms period
(**Delay to synchronize to HDLC flags on non-detection of octet violations:** 5 ms (detection of 5 consecutive flags)
(**Delay to synchronize using Octet violations when already synchronized using HDLC flag search:** 250µs (on detection of two consecutive octet violations)

Layer 2 HDLC flags
(The layer 2 HDLC flag detection and decoding compliant with EN 300 402-2; Data Link Layer; Part 2: General Protocol Specification-equivalent to ITU-T Recommendation Q.921 (1993), modified (1995));

Environmental characteristics
(**Operating ambient temperature:** 0 to 50 deg. C
(**Storage ambient temperature:** -20 deg. C to +75 deg C
(**Operating Relative Humidity Tolerance:** 10 to 90%, non-condensing
(**Storage Relative Humidity Tolerance:** 10 to 90%, non-condensing

Power Supply characteristics
(**Rack Power Supply Module:** 120V - 230 VAC +/-15%, 45-55Hz, 1A
(**120VAC or 240VAC mains:** rotary switch selector (positioned below mains inlet)
(**Mains power supply fuse:** 1,5A rating (capsule positioned below mains inlet)
(**Rack Power Supply Module fuse:** 1,25A rating (positioned within Power Supply Module)
(**Rear panel earth terminal:** to connect rack to earth.

Dimensions and weight
(**PT502 dimensions:** 49.5 W x 38 D x 21 H (cm)
(**PT502 Weight:** 18Kg
(**ECMA 253 converter rack Size:** 22.3 W x 17.8 D x 13.5 H (cm)
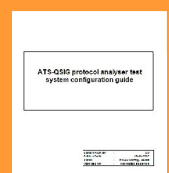(**ECMA 253 converter rack Weight:** 2 Kg (containing Power Supply module, Two G.703-EIA 530 modules);

Aluminium laminate shipping case (optional)
(**Internal case dimensions:** 49.5 x 43.2 x 30.8
(**Handles:** 3 heavy duty recessed with 3/4" grip
(**Latches:** 2 heavy duty small recessed
(**Corners:** Large ball
(**Foam:** Various thicknesses (2.5cm minimum)
(**Special Features:** Tilt wheels and a retractable handle. Trough under unit to house accessories.

User Training Course (optional)
(A one day user training course for up to 5 people is available on request.
(**User guide:** ATS-QSIG protocol analyser test system configuration guide (supplied)